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REMARKS

Following entry of the above amendments, claims 1-26 and 30-40 will be pending. Claims 27-29 have been canceled without prejudice or disclaimer. Claim 30 has been rewritten in independent form without change in scope. Claim 33 has been amended to avoid dependence on canceled claim 27. Claims 37-40 have been added.

Prior Art Rejections

The prior art rejections are addressed below in the order raised in the Action.

Combination of Gumley (Gumley '119) and Rapp

Claims 1, 2, 5-10, 15-17, 20, and 30-32 stand rejected under 35 USC 103(a) as obvious over Gumley, U.S. Patent No. 6,320,119 ("Gumley"), in view of Rapp, U.S. Patent No. 6,649,825 ("Rapp"). Withdrawal of the rejections is respectfully requested for at least the following reasons.

Gumley describes a lightning air terminal 20 that includes a central conductive rod 21 surrounded by a curved conductive surface 24. The central conductive rod 21 has a rounded conical top 34 separated from the conductive surface 24 by an air gap 44. Gumley does not disclose use of a conductive tip that is one of a set of tips.

Rapp describes a lightning rod system that has been configured to prevent injuries from occurring to someone who falls on the system. This is accomplished by making the central rod 3 flexible, and by shaping a tip 10 affixed to the rod such that (according to Rapp) it does not cause injury when impacted. Rapp, at col. 6, lines 18-22, discloses that the end caps may be made removable from the shaft or rod to allow a variety of shapes to be used with a single base. Rapp's tip shapes appear to be selected for safety characteristics, and perhaps for ornamental reasons. Rapp does not disclose use of a set of different end caps to obtain different electrical characteristics.

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Claim 1 recites a lightning protection device that includes, *inter alia*, a conductive tip that is one of a set of tips that may be coupled to the tip mount of the central rod, wherein the tips impart different electrical characteristics to the lightning protection device. In the latest Action the previous reference to a motivation involving pre-discharge corona has been dropped, leaving "to provide a safer lightning protection system by installing less pointed conductive tips" as the only motivation given for the combination. There are at least two problems with this motivation and the combination. First of all (as discussed in the previous Reply), there would be no reason to seek a safer alternative to Gumley's tip, since Gumley's device does not utilize any sharp points that might provide a safety hazard (see Gumley, Fig. 2). Gumley's rod 21 has a top 34 that is described as "a slightly convex, shallow dome, or rounded conical top," col. 6, lines 50-51. The shape of Gumley's top 34 is very similar to the shape of Rapp's curved tip 10 shown in Figs. 2, 3, 6-9, and 12. All of the other tips disclosed in Rapp (shown in Figs. 1, 4, 5, 10, and 11) either come to points or have corners (or both). Rapp does not disclose any tip shape that is preferable from a safety point of view to Gumley's conical top 34, the only shape disclosed in Gumley. Indeed, most of Rapp's tips are *more* hazardous than Gumley's. There is no safety-related reason for the combination, and thus claims 1, 2, 5-10, 15-17, and 20 are patentable over Gumley and Rapp.

Second, there is no suggestion in Rapp or Gumley of providing a set of tips for Gumley's device, with different electrical characteristics. Even one were to assume that Rapp's different conductive tips had different electrical characteristics (something not disclosed in either reference, especially with regard to using Rapp's tips in Gumley's device), there is no teaching or suggestion in either reference of the desirability of having a set of different tips with different electrical characteristics. In contrast, the desirability of this feature is explicitly discussed in paragraph [0049] of the present application – an advantage that neither reference shows cognizance of. Again there is

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no motivation for the combination, and for another reason claims 1, 2, 5-10, 15-17, and 20 are patentable over Gumley and Rapp.

Dependent claims 2 and 8 recite that the set of tips include tips with different radii of curvature at their free ends. Dependent claim 5 recites that the set of tips includes tips with at least three different radii of curvature at respective free ends of the tips. In the Action, Rapp is relied upon for teaching a set of tips, and Gumley is relied upon for teaching "that conductive tips have different radii of curvature." Neither reference teaches or suggests any reason for employing different radii of curvature as possible tips for the same device. Thus claims 2-5, 8, and 9 are patentable over Gumley and Rapp for an additional reason.

Claim 9 recites a set of tips with at least three tips with unique diameter-radii combinations. Neither reference teaches or suggests tips with multiple unique diameter-radii combinations. That different types of past lightning protection devices have had different diameters and have had different radii of curvature does not suggest the recited feature. Therefore claim 9 is patentable over Gumley and Rapp for still another reason.

Claim 30 recites a method of lightning protection that includes, *inter alia*, controlling electrical field characteristics and controlling the width of a spark gap by selecting a tip for coupling to a tip mount of the central rod, from a tip set including a plurality of tips, wherein the tips include tips with different radii of curvature at free ends, and wherein the tips include tips with different diameters in their central portions. The above discussion with regard of a lack of motivation for combining Gumley and Rapp applies with equal force here. In addition, neither Gumley nor Rapp teach or suggest controlling electrical field characteristics by selecting a tip from a tip set with tips having different radii of curvature and different diameters. Gumley's disclosure that annular gap can be varied and Rapp's disclosure of removable tips does not render obvious the recited selecting from a tip set with different radii of curvature and different diameters.

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Thus for multiple reasons claims 30-32 are patentable over Gumley and Rapp.

Combination of Gumley '119, Rapp, and Gumley '213

Claims 3 and 4 stand rejected under 35 USC 103(a) as obvious over Gumley (sometimes referred to below as "Gumley '119") in view of Rapp, further in view of Gumley, U.S. Patent No. 4,760,213 ("Gumley '213"). Gumley '213 does not provide the above-discussed missing motivation for combining Gumley '119 and Rapp. For this reason claims 3 and 4 are patentable over Gumley '119, Rapp, and Gumley '213.

Combination of Gumley '119, Rapp, and Ruckman

Claims 11-14, 22-26, and 33-36 stand rejected under 35 USC 103(a) over Gumley '119 in view of Rapp, further in view of Ruckman, U.S. Patent No. 4,571,656 ("Ruckman"). Withdrawal of the rejections is respectfully requested for at least the following reasons.

Ruckman discloses an electrical circuit 10 for protecting against transient impulse surge overvoltages from AC or DC lines. Ruckman's circuit 10 includes a varistor 30, as well as zener diodes 24 and 26, and a resistor 28. Aside from a mention that lightning strikes (among other things) may cause voltage transients, Ruckman does not discuss lightning protection at all.

Ruckman does not provide the missing motivation for combining Gumley '119 and Rapp, that is discussed above with regard to claim 1. For this reason claims 11-14 and 33-36 are patentable over Gumley '119, Rapp, and Ruckman.

In addition, it would have not been obvious to have made the proposed modification, placing components of Ruckman's circuit 10 between Gumley's central conductive rod 21 and curved conductive surface 24. Ruckman's circuit 10 serves a completely different purpose from that of Gumley's device, or any part of Gumley's device. There is not the slightest indication from either Ruckman or Gumley that

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Ruckman's circuit 10 (or any significant part thereof) would be useful if incorporated into Gumley's device. Gumley's device is designed to preferentially draw lightning strikes in order to channel the energy safely through a central rod into the ground. Ruckman's device is merely a surge protector for AC or DC electrical lines. Ruckman's circuit 10 has nothing whatsoever to do with the problem Gumley is trying to solve, that of effectively attracting lightning strikes. Since Ruckman's circuit 10 has nothing to do with optimizing a triggering point (see Gumley '119, col. 6, line 64 – col. 7, line 5), one encountering Ruckman would not be expected to come up with the modification proposed in the Action. Since Gumley and Ruckman describe completely different sorts of devices, having different purposes, and since Ruckman's circuit 10 (with its varistor 30) has nothing to do with its purpose in the proposed modification of Gumley's device, there is no motivation for the proposed combination. Thus claims 11-14, 22-26, and 33-36 are patentable over Gumley '119, Rapp, and Ruckman.

Combination of Gumley '119, Rapp, and Mansfield

Claim 21 stands rejected under 35 USC 103(a) over Gumley '119 in view of Rapp, further in view of Mansfield et al., U.S. Patent No. 5,652,690 ("Mansfield"). Mansfield does not make up for the lack of motivation to combine Gumley '119 and Rapp, and the failure of Gumley '119 and Rapp to teach or suggest all of the features of claim 1. Therefore claim 20 is patentable over Gumley '119, Rapp, and Mansfield.

Combination of Gumley '119, Rapp, and Gumley '578

Claims 18 and 19 stand rejected under 35 USC 103(a) as obvious over Gumley '119 in view of Rapp, further in view of Gumley, WO 94/17578 ("Gumley '578"). Gumley '578 does not provide the missing motivation for combining Gumley '119 and Rapp, as discussed earlier. For this reason claims 18 and 19 are patentable over Gumley '119, Rapp, and Gumley '578.